Improving The Fine Motor Ability of Children With Cerebral Palsy Through Contextual Learning Based on Maze Game Media

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Abstract

The Maze game media helps develop children's fine motor abilities, such as flexing fingers and wrists, and fine motor skills linked with the movement skills of both hands, as well as their capacity to combine eye senses and hand activity. This study aims to determine the increase in fine motor skills of children with cerebral palsy through a contextual learning model based on maze game media at 3 to 8 years old at SDLB Type D Disabled Children Foundation, South Jakarta. This research method uses action research. Action research is cycle-oriented research on various actions or interventions carried out by researchers as classroom teachers. The research took place from the design stage to the evaluation of practical classroom interventions regarding teaching and learning activities to enhance the fine motor skills of cerebral palsy-affected students. In the 2021-2022 school year, researchers studied children's fine motor abilities using maze game media. This research consists of three cycles (pre-cycle, cycle 1, and cycle 2). The results of this study indicate that the improvement of fine motor skills of children with cerebral palsy through media-based contextual models maze games are effectively negative or low inclined. This research implies that one of the creative ways to improve fine motor skills is through activities based on contextual learning models based on maze game media. In addition, using maze media can effective communication between class teachers and CP children so that CP children have better concentration and are independent in carrying out their fine motor movements at school and home

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Introduction

Unknown is the global incidence and prevalence of birth-related brain injury that eventually cause children to develop permanent motor disorders. Cerebral palsy (CP), the most prevalent neuromotor condition affecting children, is highest in developing countries. (1) A permanent mobility disability known as CP is caused by injury to the brain during pregnancy or the postnatal period up to age 5. (2) Around 75% of children with CP are ambulatory, but many of these kids are physically unable to keep up with their peers since they cannot walk as rapidly and smoothly and are far more likely to trip and fall. (3) In its various forms, cerebral palsy (CP) is a non-progressive condition that develops during

prenatal brain development or early childhood. It is characterized by movement, posture, and tone modifications, resulting in developmental potential. (4) A range of persistent developmental problems that are not progressing is referred to as cerebral palsy (CP); it primarily affects posture and accessibility (Elvrum et al., 2016), with repercussions on everyday activities and related secondary impairments such as cognitive, linguistic, and visual impairments (Facchin et al., 2011; Oskoui et al., 2013). According to (Patel et al., 2020), CP is thought to be the most frequent cause of physical impairment in children. Importantly, CP is a permanent, non-progressive, and lifelong neurological disorder. Considering the body topography of the lesion, CP may be categorized into two main categories: bilateral and unilateral (Rosenbaum, 2007).

On the other hand, children with disabilities also have unique nerve damage and difficulties with movement coordination, perception, and cognition. This condition often affects a person's gross or subtle motions. Thus, changes and adaptations must be made to provide educational services. These may be divided into three categories: children with other health issues, children with bone injury, and children with nerve damage. Injury to the central nervous system or insufficient nerve cell development are the two primary causes of nerve damage. Cerebral palsy, epilepsy, spina bifida, and other severe neurological conditions result in brain damage (Jamaris, 2013; Zaitun, 2017).

This research focuses on Improving the Fine Motoric Ability of children with cerebral palsy through the Contextual Learning Model (Contextual Teaching and Learning) based on Maze Game Media for grades 1 and 2 of SDLB YPAC South Jakarta City DKI Jakarta Province 2020/2021 Academic Year, which includes the following aspects: 1) Ability to identify pictures of labyrinth paths, 2) Ability to move the fingers independently and 3) Control the movement of the fingers.

This research is in the form of action research, which generally aims to collect data related to Improving Fine Motoric Ability in Grades 1 and 2 SDLB, Academic Year 2021/2022. The specific objectives of this research are as follows: 1) To determine the effectiveness of fine motor skills in children with cerebral palsy before using maze media games in contextual learning models for grades 1 and 2 at SDLB YPAC South Jakarta City, DKI Jakarta Province, 2020/2021 Academic Year. 2) Knowing the steps of playing maze media in contextual learning models in children with cerebral palsy grades 1 and 2 at SDLB YPAC South Jakarta City, DKI Jakarta Province, Academic Year 2021/2022. 3) Analyzing the effectiveness of media maze games in improving fine motor skills in children with cerebral palsy grades 1 and 2 at SDLB YPAC South Jakarta City, DKI Jakarta Province, Academic Year 2021/2022.

The data collection instruments include: 1) A direct observation instrument, namely the observation technique, is carried out starting from the initial baseline stage to the evaluation stage with an observation form and a camera. 2) Instruments Direct interviews were conducted only at the initial baseline stage with class teachers and parents of Cerebral Palsy students using interview forms and voice recorders.

Children with cerebral palsy can have different levels of fine motor function, and the Bimanual Fine Motor Function (BFMF) test demonstrated good construct validity. Furthermore, the Manual Ability Classification System (MACS) classification of manual performance in daily life may differ from the BFMF's classification of sufficient motor capacity in ways that are useful for understanding the potential discrepancy between the child's ability to grasp, hold, and manipulate objects and that of typical manual performance. Most of the kids in this study had comparable BFMF and MACS levels, suggesting that most kids employed their fine motor function (BFMF) when handling things in daily life (MACS) (Charles & Gordon, 2006; Krumlinde-sundholm & Eliasson, 2003). This possible difference merits consideration in children with additional CP sub types and unilateral spastic CP. The use of the BFMF to categorize fine motor function based on the kid's ability to grasp, hold, and manipulate in an environment that promotes the child's best capacity, as well as the use of the

BFMF sub classifications (a) and (b) to provide information about potential differences in fine motor abilities between the two hands (Elvrum et al., 2016)

Suryawati (Suryawati et al., 2010) states that the Contextual Learning Model is a learning concept that helps teachers connect the material they teach with real-world situations. Learning with the knowledge they have can be applied in their lives as members of the family and society. The design of Contextual-based learning programs is as follows: States the general objectives of learning (formulates/concludes) States the main learning activities (observation and action), namely statements of learner activities Details of media to support these activities (observation/observer) Creating scenarios step by step of learning activities (learning preparation/state) Sharing information in groups (Combination). Each group member provides a report on learning problem-solving (communication). State the authentic assessment (implementation), namely with what data the learner's participation can be observed in the authentic assessment

Practising maze- games can enhance the visual-spatial intelligence of kids (Faradisya et al., 2018; Sofia et al., 2021; Wulandari et al., 2018). Children's spatial intelligence is 77.7%, as seen from the average rise from the first cycle of 33.43%. Before the child's acts, the starting circumstances of the average visual-spatial intelligence were 44.27%. The average score of the children's visual-spatial intelligence acquired in the second cycle was 84.89% since the nan rose by 7:19% after the second cycle. This study suggests that playing a maze-like game might enhance visual-spatial intelligence. Using a range of media to conduct a maze every day, as well as having the group members engage in individual activities (Faradisya et al., 2018; Rosidah, 2014; Wulandari et al., 2018).

Children's fine motor skills also experience development step by step towards perfection. Fine motor development is a process that goes hand in hand with gradual age and irrational movements that increase from simple, unorganized and unskilled movements of complex and well-organized motor skills, which in the end the movements of skills follow the process of aging or become old . Fine motor skills, which are available are a group of small muscles, such as: fingers, hands, arms, and often require accuracy and hand-eye coordination (Fitriani et al., 2022; Pura, 2019; Suriati et al., 2019).

To develop fine motor skills, children need to be given the opportunity to play various types of games that involve hand and finger movements, such as sand play, meronce, coloring, putting together puzzles, using paper cutting tools, and playing with lego (Anggraeni & Na'imah, 2022; Novitasari et al., 2019). Through these activities, children can practice their fine motor skills naturally while having fun. Fine motor development in children with cerebral palsy can be intervened through various therapies and rehabilitation approaches, such as physical therapy, occupational therapy, and speech therapy. This therapy aims to improve muscle strength, coordination, manipulative skills, and reduce muscle contractures. Through consistent practice and according to children's abilities, they can achieve better development in their fine motor skills. It is also important to involve the family and the child's environment in supporting fine motor development. Creating a supportive environment, providing appropriate assistance, and providing opportunities to practice everyday skills will contribute to improving the fine motor skills of children with cerebral palsy. Research on fine motor skills based on maze game media in CP children at SDLB Type D YPAC South Jakarta for the 2021–2022 school year carried out in three cycles that apply contextual learning steps that can improve students' fine motor skills. The results of the researcher showed that there was little fine motor development from pre-cycle to two cycles, and the TCP (Developmental Achievement Level) of each CP child reached a minimum limit of 30. In the pre-cycle phase, the psychological condition of CP children was not yet adaptive, including unstable emotions with media-based contextual learning modules. Children with CP often exhibit adaptive psychological symptoms in phase 2 of the cycle, including relatively stable emotions, and they have begun to focus on comprehending what the researcher revealed about the labyrinth pattern in the maze game media. In the cycle 3 phase, the psychological condition is adaptive,

and there is already one CP child who has stable emotions and understands the explanation of the maze pattern in the maze game media. Fine motor skills covering the fingers of CP children tend to improve from Pre cycles, cycle 1 to 2 so that CP children can be independent in carrying out movements of both hands following the labyrinth pattern in the maze game media.

Methodology

The research used ten subjects, consisting of six boys and four girls with Spastic Cerebral Palsy aged 5–8 years who had fine motor skills. Cerebral Palsy aged 5–8 years who had fine motor skills. The sample was identified by gathering evaluation data from therapists at the Jakarta Disabled Child Development Foundation for various children with Spastic Cerebral Palsy (Sunanto, 2005)

The ability of a kid to comprehend, grasp, and handle objects in a way that fosters their best skills and informs them of any potential hand differences through the Levels is known as fine motor skills. The first is using one hand freely, including for indicators. (1) Left hand using indications and objects; (2) Right hand not using items. The second level is the manipulation of one hand with another without restrictions, including indicators (1) that the left-hand does not hold objects and indicators (2) that the right hand holds objects.

The third level is that one hand has limited ability, including indicators (1) that the left hand can hold objects for a short time and (2) that the right-hand holds objects for a long time. The fourth level is both hands understanding brain commands, including indicators (1) left hand holding objects and indicators (2) right hand holding objects. The five level; Both hands only can hold objects, including indicators (1) adaptation to holding a pencil and indicators (2) adaptation to holding a pencil.

Media Maze can be used and practical in the fine motor development of children because it is easy to use and, safe and fun for children. In the process of improving fine motor skills based on maze media in CP children through a contextual learning model that includes several shapes, colors, and maze patterns in maze activity sheets at SDLB type D YPAC South Jakarta for the 2021-2022 academic year, researchers and collaborators found several findings in the field, as follows: a teacher and parent. Before entering the class, the researcher, acting as a teacher, introduced himself and asked permission from the parents of CP children who accompanied their children to study to carry out the CP children's simulation. After the parents allowed it, the teacher invited CP children to enter the class to receive lessons. The research began with greeting activities and introducing how each CP child reads a prayer in class. T288).

The research method used is Kemis Taggart. This method was chosen because Kemis Taggart is classroom action research; action research is research that does not concern static things but dynamic forms, which want a change in a better direction from an educational practice carried out by the teacher by doing actions in learning. Parties involved in classroom action research (teachers with researchers) consciously try and develop skills in detecting and solving problems that occur in classroom learning through action in the sense that they can be calculated and solve problems and improve conditions. This research was carried out and carefully observed to measure the level of success on Children with cerebral palsy through a contextual learning model based on maze game media at 5 to 8 years old at SDLB Type D Disabled Children Foundation, South Jakarta. The research instruments used to measure fine motor skills in early childhood is Maze game. Classroom action research is part of action research, and action research is part of general research. Research is an investigative activity based on scientific or technological methods (Arikunto, 2015; Legiman, 2015)

Result and Discussion

Research on Improving Fine Motoric Skills in Children's Cerebral Through Contextual Learning Models Based on Maze Games at SDLB Type D YPAC South Jakarta for the 2021–2022 school year is carried out in three cycles, where each cycle is carried out in eight meetings.

Table 1. Conversion of Fine Motoric Scores of Both Hands in the Pre-Cycle, One and Two Cycle Period

Score range	Score	Summary	
19-24	1	Not Developed	(BB)
25-30	2	Expected Growth	(MB)
31-35	3	Start Growing	(BSH)
36-40	4	Very Well Developed	(BSB)

Table 1 reveals that the Range (Interval) of both hands' fine motor abilities in the maze is 19, indicating that they have not yet developed and cannot move the pencil on the labyrinth activity sheet. As a result, the CP children in the labyrinth had underdeveloped fine motor abilities (these people have yet to manipulate a pencil). The range (interval) of the fine motor skills of both hands in the maze is 20, which means they are starting to develop (be slightly able) to move the pencil on the maze activity sheet. So the fine motor skills of CP children in the maze are the fine motor skills that are starting to develop (slightly capable) in moving a pencil. According to the explanations in Table 1, the two hands in the maze have a Range (Interval) of fine motor skills of 30, which indicates that they are Developing According to Expectations (Quite Able) to move the pencil on the labyrinth activity sheet. So the CP children's fine motor abilities in the labyrinth are their fine motor abilities that develop by expectations (competent enough) in moving a pencil.

Based on the result of Table 2, showed, the class average of the fine motor skills of the hands of group A students at SDLB YPAC TA. 2021-2022 in the pre-cycle maze is 24, still relatively low in moving the pencil on the maze activity sheet. The table explains that the fine motor skills of CP children using mazes have not yet reached TCP Max (Maximum Development Achievement Level), where TCP Max is 40. The average level of developmental Achievement obtained by CP children is 24 in the pre-cycle of TCP Max 40. At this pre-cycle stage, the typical CP child has not yet achieved TCP Max (the highest developmental accomplishment level), and all CP children are still in the Starting to Develop position (Slightly Able to Move a Pencil).

Table 2. Fine motor skills of CP children based on maze game media

No.	Respondent	Pre Cycle		Cycle 1		Cycle 2	
		TCP	information	TCP	information	TCP	information
1.	PI	28	(MB)	29	(BSH)	39	(BSB)
2.	AR	21	(BB)	25	(MB)	34	(BSH)
3.	IL	24	(BB)	30	(BSH)	33	(BSH)
4.	BLS	26	(MB)	35	(BSB)	29	(BSH)
5.	AL	26	(MB)	37	(BSB)	38	(BSB)
6.	KRA	25	(MB)	31	(BSH)	37	(BSH)
7.	DE	27	(MB)	38	(BSB)	37	(BSH)
8.	RE	17	(BB)	36	(BSB)	37	(BSH)
9.	BE	24	(BB)	38	(BSH)	38	(BSB)
10.	AN	21	(BB)	25	(MB)	31	(BSH)
∑ average		24	∑ average	32.4	∑ Average	35.3	

Based on the study's results, it was shown that the highest results were obtained from students PI (28 MB).   The lowest results were shown by RE students.

In the average degree of development gained by CP children utilizing maze media in the first cycle was 32.4 from TCPMax 40. The story of CP children is still in a very well-

developed position (able to move a pencil). Table 2 shows the ability of each CP child to use maze media, getting an increase compared to the pre-cycle, namely PI TCP 29, AR TCP 25, IL TCP 30, BLS TCP 35, AL TCP 37, KRA TCP 31, DE TCP 38, RE. TCP is 36, BE TCP is 38, and AN TCP is 25. AR and AN showed the lowest results are 25

The fine motor skills of group A students at SDLB YPAC TA. 2021-2022, using maze media (Beckung), are shown in Table 2 at the second cycle of study, based on the results of research on the development of CV children in moving pencils on the maze activity sheet by the researchers' expectations. The results showed in Table 2, the fine motor skills of CP children in the maze are close to achieving TCP Max (Maximum Development Achievement Level), with a value of 40. The average result obtained is the development achievement level (TCP) in CP children, namely 35.4. Children with CP are still in the developing stage of the second cycle, Based on study results, especially being able to move a pencil. Table 2 shows the findings for each CP kid, namely PI's TCP of 39, AR's TCP of 34, ILl's TCP of 33, BLS' TCP of 30, AL's TCP of 38, KRA's TCP of 37, DE's TCP of 37, RE's TCP of 37, BE's TCP of 38, and AN's TCP of 31.

It should be noted that fine motor skills in children with cerebral palsy increase after the action is taken. The data regarding the improvement of fine motor skills in children with CP starting from pre-intervention (pre Cycle) up to cycle 2 are as follows: Based on the study's results, it was shown that the fine motor skills of children with CP based on maze game media from per-cycle to cycle 2 increased (Table 2). The highest results were obtained from students Al (26–38) and Baby (24–38). The lowest results were shown by BLS students (26-29) and AN (21-31). (table 2). On one hand: manipulated without restrictions. On the other hand: manipulated without restrictions or limitations in more advanced fine motor skills.

This follows the opinion of Garderner (Gardner, 1993), namely the ability to form mental models of the spatial world and manoeuvre and operate using these models.
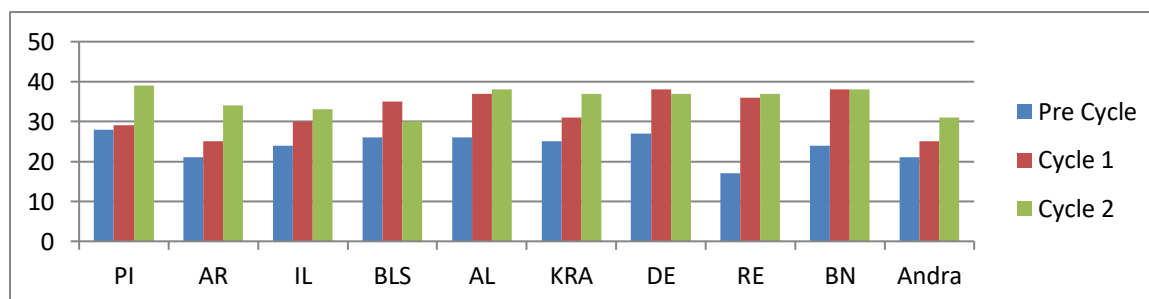

Figure 1. Graph Fine Motoric Ability Based on Media Maze in Children with Cerebral Palsy at SDLB YPAC Jakarta Academic Year 2021/2022 in Pre-cycle, Cycles 1 and 2

Figure 1, shows that the fine motor skills based on the Media Maze in children with cerebral palsy at SDLB Type D YPAC South Jakarta, starting from Pre-Cycle, Cycle 1 to Cycle 2, experienced a slight increase. Table 4.6 explains that the average TCP in the Pre-Cycle is 24 TCP Max 40; in Cycle 1, the child TCP average is 30 TCP Max 40; in Cycle 2, the child TCP average reaches 35.4 TCP Max 40. The average TCP child from cycle 1 to cycle 2 has increased by 5.4. As for cycle 2, the average TCP for children is 35.3, from a TCP Max of 40; thus, CP children have reached a minimum TPC of 30. TCP was obtained by Putri with 39. In contrast, the lowest TCP was obtained by Balqis with 29, which did not reach the TCP Min of 30. The increase experienced by children with CP that occurred from cycle 1 to cycle 2 was due to researchers and collaborators using various ways of explaining to children that children are skilled at holding, gripping, and directing pencils with their fingers to follow the maze plot contained in maze activity sheets and maze boards in the form of animals. The systematic difference between capacity and performance found for several CP subtypes shows that both aspects of hand function deserve attention. For children with unilateral spastic CP, the need

for differentiation between adequate motor capacity and manual performance has been recognized clinically both for treatment planning and outcome evaluation (Facchin et al., 2011; Krumlinde-sundholm & Eliasson, 2003) whereas little is known about the relationship between adequate motor capacity and manual performance for other CP subtypes. Our results indicate that this topic needs to be further investigated.

The results of the researcher showed that there was little fine motor development from pre-cycle to two cycles, and the TCP (Developmental Achievement Level) of each CP child reached a minimum limit of 30. In the pre-cycle phase, the psychological condition of CP children was not yet adaptive, including unstable emotions with media-based contextual learning modules. Children with CP often exhibit adaptive psychological symptoms in phase 2 of the cycle, including relatively stable emotions, and they have begun to focus on comprehending what the researcher revealed about the labyrinth pattern in the maze game media. In the cycle 3 phase, the psychological condition is adaptive, and there is already one CP child who has stable emotions and understands the explanation of the maze pattern in the maze game media. Fine motor skills covering the fingers of CP children tend to improve from Pre cycles, cycle 1 to 2 so that CP children can be independent in carrying out movements of both hands following the labyrinth pattern in the maze game media. Similar research using Sutapa (2021) on 40 children aged 4-6 years in multiple kindergartens in Malaysia demonstrates that fine motor abilities were improved hanced by learning activities while playing with learning media.

Table 3. The Regression and T-Test (Effectiveness) of the three research variables

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,926[a]	,858	,818	21,56060

a. Predictors: (Constant), Maze, Kontekstual)

Table 3 showed that the Regression and T-Test (Effectiveness) of the three research variables Based on the data above, the regression of fine motor skills through contextual learning models based on maze game media is 0.926. Correlations between additional neuro impairments, activity limitations, and participation restrictions are shown in Table 3 Statistically, all additional impairments except infan tile hydrocephalus correlated highly significantly to each other (p<0.0001). The associations between learning disability, activity limitations, and participation restrictions. The researchers discovered that most children generally couldn't hand pencils and scissors properly, so when asked to write, most children couldn't register properly. In connection with this, researchers intend to develop activities that let kids use learning media maze game to hone their fine motor abilities. It has done this to make the activities more engaging and to inspire children's interest.

Table 4. Analysis of the coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-77,524	32,379		-2,394	,048
	Kontekstual	-3,929	2,516	-4,578	-1,562	,162
	Maze	4,623	2,476	5,472	1,867	,104

Based on the analysis of the coefficients above, the effectiveness of increasing fine motor skills on contextual learning models based on maze game media is -2.394, a significant

0.048, which turns out to be 0.05 (Tcount), is more significant than T-table Cronbach alpha 0.05 (1.812461), so that the effectiveness of fine motor skills on models of contextual learning based on maze game media tends to be hostile or weak.

Figure 2. shows the One Hand Manipulation Without Restriction Level activity through the right hand (holding a pencil).

Figure 3. shows the Second Hand Level of activities Understanding Brain Commands in fine motor skills such as Right and Left Hands writing numbers and nouns on the maze activity sheet

Conclusion

The minimal fine motor development from pre-cycle to cycle two TCP (Developmental Achievement Level) of each CP child reaches a minimum limit of 30. In the pre-cycle phase, the psychological condition of CP children has not been adaptive, including unstable emotions, with media-based contextual learning modules provided by researchers. In the cycle 1 phase, the psychological condition of CP children tends to be adaptive, including slightly stable emotions with media-based contextual learning modules provided by the researcher and trying to concentrate on understanding the researcher's instructions explaining the labyrinth pattern in the game media. In the cycle 2 phase, psychological conditions began to be adaptive, and one of the CP children (PUT) experienced stable emotions and began to concentrate on understanding the researcher's instructions explaining the pattern of the maze game. Fine motor skills, including the fingers, CP children tend to improve from cycle 1 to cycle two so that CP children can be independent enough to carry out movements of both hands that follow the labyrinth pattern of game media. Research on fine motor skills based on maze game media in CP children at SDLB Type D YPAC South Jakarta for the 2021-2022 school year was carried out in two cycles in which this study applied contextual learning steps that could improve fine motor skills in students. There is an increase in Fine Motoric Ability towards Contextual Learning Models based on Effective Maze Game Media which tends to be hostile or low.

References

Anggraeni, D., & Na'imah. (2022). Strategi Stimulasi Perkembangan Motorik Kasar Anak. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *6*(4), 2553–2563. https://doi.org/10.31004/obsesi.v6i4.2103

Arikunto, S. (2015). *Penelitian Tindakan Kelas*. Bumi Aksara.

Charles, J., & Gordon, A. M. (2006). Development of hand-arm bimanual intensive training (HABIT) for improving bimanual coordination in children with hemiplegic cerebral palsy. *Developmental Medicine and Child Neurology*, *48*(11), 931–936. https://doi.org/10.1017/S0012162206002039

Elvrum, A.-K. G., Andersen, G. L., Himmelmann, K., Beckung, E., Öhrvall, A.-M., Lydersen, S., & Vik, T. (2016). Bimanual Fine Motor Function (BFMF) Classification in Children with Cerebral Palsy: Aspects of Construct and Content Validity. *Physical & Occupational Therapy In Pediatrics*, *36*(1), 1–16. https://doi.org/10.3109/01942638.2014.975314

Facchin, P., Rosa-Rizzotto, M., Pozza, D. L. V., Turconi, A. C., Pagliano, E., Signorini, S., Tornetta, L., Trabacca, A., Fedrizzi, E., & Group, G. S. (2011). Multisite trial comparing the efficacy of constraint-induced movement therapy with that of bimanual intensive training in children with hemiplegic cerebral palsy postintervention results. *American Journal of Physical Medicine & Rehabilitation*, *90*(7), 539–553. https://doi.org/10.1097/PHM.0b013e3182247076

Faradisya, S. P., Iswari, M., & Mata, K. (2018). Meningkatkan Kemampuan Koordinasi Mata dan Tangan Melalui Bermain Maze Pada Anak Cerebral Palsy. *Jurnal Pendidikan Berkebutuhan Khusus*, *7*(1). https://jpkk.ppj.unp.ac.id/index.php/jpkk/article/view/200

Fitriani, A., Hasanah, U., & Nopiana. (2022). *Meningkatkan Perkembangan Motorik Halus Anak melalui Media Plastisin*. 2, 94–111. https://doi.org/10.56872/elathfal.v2i02.833

Gardner, H. (1993). *Multiple Intelegences*. Basic Book.

Jamaris, M. (2013). *Orientasi Baru Dalam Psikologi Pendidikan*. Ghalia Indonesia.

Krumlinde-sundholm, L., & Eliasson, A. (2003). Development of the Assisting Hand Assessment: A Rasch-built Measure intended for Children with Unilateral Upper Limb Impairments. *Scandinavian Journal of Occupational Therapy*, *10*(1), 16–26. https://doi.org/10.1080/11038120310004529

Legiman. (2015). Penelitian Tindakan Kelas (PTK). *LPMP Yogyakarta*, *1*(1).

Novitasari, R., Nasirun, M., & D., D. (2019). Meningkatkan Kemampuan Motorik Kasar Anak Melalui Bermain Dengan Media Hulahoop Pada Anak Kelompok B Paud Al-Syafaqoh Kabupaten Rejang Lebong. *Jurnal Ilmiah POTENSIA*, *4*(1), 6–12. https://doi.org/10.33369/jip.4.1.6-12

Oskoui, M., Coutinho, F., Dykeman, J., Jetté, N., & Pringsheim, T. (2013). An update on the prevalence of cerebral palsy: a systematic review and meta-analysis. *Developmental Medicine and Child Neurology*, *55*(6), 509–519. https://doi.org/10.1111/dmcn.12080

Patel, D. R., Neelakantan, M., Pandher, K., & Merrick, J. (2020). Cerebral palsy in children: a clinical overview. *Translational Pediatrics*, *9*(Suppl 1), S125–S135. https://doi.org/10.21037/tp.2020.01.01

Pura, D. N. (2019). Perkembangan Motorik Halus Anak Usia Dini Melalui Kolase Media Serutan Pensil. *Jurnal Ilmiah Potensia*, *4*(2), 131–140. https://ejournal.unib.ac.id/potensia/article/view/7671

Rosenbaum, J. (2007). The Definition and Classification of Cerebral Palsy. *Developmental Medicine and Child Neurology*, *49*(s109), 1–44. https://doi.org/10.1111/j.1469-8749.2007.00001.x

Rosidah, L. (2014). Peningkatan Kecerdasan Visual Spasial Anak Usia Dini Melalui Permainan Maze. *Jurnal Pendidikan Usia Dinisia Dini*, *8*(2), 281–290.

https://doi.org/https://doi.org/10.21009/JPUD.082.09

Sofia, A., Nopiana, & Suryadi. (2021). Faktor Penunjang dan Penghambat dalam Pengembangan Kecerdasan Moral Anak Usia Dini 5-6 Tahun. *Jurnal Obsesi*, *5*(1), 591–610. https://doi.org/10.31004/obsesi.v5i1.467

Suriati, S., Kuraedah, S., Erdiyanti, E., & Anhusadar, L. O. (2019). Meningkatkan Keterampilan Motorik Halus Anak melalui Mencetak dengan Pelepah Pisang. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *4*(1), 211. https://doi.org/10.31004/obsesi.v4i1.299

Suryawati, E., Osman, K., & Meerah, T. S. M. (2010). The effectiveness of RANGKA contextual teaching and learning on students' problem solving skills and scientific attitude. *Procedia - Social and Behavioral Sciences*, *9*, 1717–1721. https://doi.org/10.1016/j.sbspro.2010.12.389

Wulandari, A. D., Sumarni, S., & Rahelly, Y. (2018). Pengembangan Game Maze Berbasis Media Interaktif Sesuai Tema Untuk Anak Usia 5-6 Tahun Di TK IT Izzudin Palembang. *Jurnal Pendidikan Anak*, *7*(1). https://doi.org/DOI:https://doi.org/10.21831/jpa.v7i1.26329

Zaitun. (2017). *Pendidikan Anak Berkebutuhan Khusus*. Kreasi Edukasi. https://docplayer.info/74382532-Zaitun-pendidikan-anak-berkebutuhan-khusus.html